

**PhD Comprehensive Examination Committee Submission Form**

COMPREHENSIVE EXAMINATION FOR: \_\_\_\_\_ STUDENT #: \_\_\_\_\_

DATE OF REGISTRATION: \_\_\_\_\_

SUPERVISOR(S): \_\_\_\_\_

The suggested membership of the Examining Committee and area of questions related to the research area are:

Examiners:	General Areas of Questions	Informed <i>(tick here when copies sent to examiners)</i>
1. _____	_____	
2. _____	_____	
3. _____	_____	
4. _____	_____	

The examination is to be tentatively\* held on: \_\_\_\_\_ at: \_\_\_\_\_ am/pm in Room \_\_\_\_\_  
*(Date, time and room to be set by supervisor after consultation with examiners, and before seeking approval from the Department Graduate Board Chair and Associate Dean).*

\* Pending submission and approval of research proposal

**APPROVALS:**

Chair of Comprehensive Examination: \_\_\_\_\_  
*(Appointed by Graduate Program Coordinator)* \_\_\_\_\_  
*(Date appointed)*

Associate Chair (Graduate): \_\_\_\_\_  
\_\_\_\_\_  
*(Date)*

Copy to: Student  
Supervisor(s)  
Examiners  
Chair  
(A copy of the Faculty of Engineering Comprehensive exam guidelines is also supplied to student)

## PhD Comprehensive Examination Guidelines and Procedures

Students are required to complete a Comprehensive Examination, which **must be set within the first 3 terms of PhD study, and must be passed before the end of the 4<sup>th</sup> term of PhD study**. To schedule the PhD Comprehensive Examination, the Student must submit a PhD Comprehensive Examination Submission form to the CEE Graduate Office during the student's 3rd term of study.

The Comprehensive Examination provides a mechanism to assess the Student's suitability and readiness to continue the PhD Program. The comprehensive examination consists of two parts: Research Proposal and Oral Examination. The Oral Examination focuses on the fundamentals of engineering science relevant to the area/topic of research and the appropriate methodologies to conduct the proposed research.

The Student is required to submit a written Research Proposal of their PhD research (2500-3500 words, double-spaced, up to 10 figures/tables) three (3) weeks prior to the scheduled comprehensive examination date to the CEE Graduate Office. The Research Proposal should include the following content/sections:

- ✓ A critical review of the key literature relevant to the proposed research, with an emphasis on the strengths and weaknesses of previous research, such that the student clearly demonstrates the gaps in knowledge that the proposed research will address.
- ✓ The objectives of the proposed research are clearly stated.
- ✓ A detailed discussion of the research methods that the student will be using in their research (e.g. experimental, analytical, computational). As appropriate to the student's field of research, the discussion should show an understanding of the advantages, disadvantages, and accuracy of the applicable techniques for the problems being addressed, in relation to any other alternative approaches.
- ✓ A summary of the program of research that will be carried out, including any progress or findings made to date.
- ✓ A statement on expected outcomes and novelty of the research including the contributions that the student expects to make in advancing their field of research.

An assessment rubric for the Research Proposal is available from the CEE Graduate Office to help the student during the writing of the Proposal.

### Examination Committee

The PhD Examination Committee shall normally consist of at least three members of the School of Graduate and Postdoctoral Studies with a Chair appointed by the CEE Graduate Affairs Coordinator in consultation with the Graduate Chair. The membership of the Examination Committee shall be proposed by the Faculty Supervisor(s) and be submitted to the CEE Graduate Office for approval by the CEE Graduate Chair. The Faculty Supervisor may be a member of the Examination Committee, but they must not be the Examination Chair. If the Student has multiple Faculty Supervisors, only one Faculty Supervisor may be a member of the Examination Committee.

In consideration of the purpose of the Examination, the members of the Committee should be chosen such that:

- (a) As a Committee, they are competent to examine the student in accordance with the scope and content of the research topic.

(b) Normally, at least two of the members will hold Doctoral Supervisory Membership in the School of Graduate and Postdoctoral Studies and have demonstrated success in supervising Ph.D. students in the general area of the student's proposed research, or in a closely related area. Such members can draw on their experience in making recommendations relevant to the program of studies followed by the student.

(c) Normally, a majority of the members will be members of the Department of Civil & Environmental Engineering.

### **Procedure Before the Examination**

- Student submits a written Research Proposal of their PhD research to the CEE Graduate Office at least three (3) weeks prior to the scheduled Oral Examination date. The CEE Graduate Office then shares the Research Proposal with the Examiners.
- Examiners review the proposal and submit the completed Proposal assessment rubric (with scores) to the CEE Graduate Office no later than one (1) week prior to the Oral Examination date.
- The Graduate Chair collates the average scores from the Examiners decides regarding whether the proposal is acceptable or unacceptable. The Graduate Chair conveys the outcome (acceptable or unacceptable) to the Student.
- If the Research Proposal is acceptable, the Oral Examination proceeds as planned.
- If the Research Proposal is unacceptable, the Student is given three (3) weeks from the date of the assessment to revise and resubmit the proposal to the CEE Graduate Office and Examiners. The Oral Examination will be rescheduled to a date at least two (2) weeks after the Research Proposal resubmission date.
- The Examiners review the revised Research Proposal and submit a new completed Proposal assessment rubric (with scores) to the CEE Graduate Office no later than one (1) week prior to the rescheduled examination date. Regardless of whether the revised Proposal is deemed acceptable or not, the Oral Examination will proceed on the rescheduled examination date.

### **Oral Examination Procedure**

The Oral Examination shall be of at least 90 minutes duration. The Oral Examination should be held in-person. A Hybrid or Online Oral Examination format is possible if one of the Examiners is not located at Western or for other special circumstances. At the beginning of the examination the Student must make a 15-minute oral presentation based on the Research Proposal. While the oral presentation is required it is not an official part of the Oral Examination but rather provides the Student the opportunity to showcase their understanding of their proposed research plan and methodology. The oral presentation is not counted towards the 90 minute minimum Oral Examination time. The oral presentation will be followed by questions to the Student from each of the Examiners. Typically, there will be two rounds of questions with each Examiner questioning for approximately 20 minutes in the first round and 10 minutes in the second round. The order of questions will be determined by the Chair in consultation with the Examination Committee at the beginning of the examination in the absence of the Student. The Student may take a five (5) minute recess after the first round of questioning if they desire.

The Student is expected to be conversant with the fundamentals of Engineering Science and Methodologies related to their proposed research area. The Examiners will establish the boundaries of the Students' knowledge by asking some questions that the Student will be able to answer and others that the Student may not be able to answer.

### **Decision by the Examination Committee**

At the end of the examination the Examiners will complete the Oral Examination assessment rubric (with scores) and the Examination Committee will make a decision on the Oral Examination based on the average scores from the Examiners. The results of the examination shall be stated as:

- (i) Passed without condition, or
- (ii) Passed with specific conditions to be satisfied for continued registration, or
- (iii) Failed with the option of oral re-examination, or
- (iv) Failed with the requirement to withdraw from the PhD program or transfer to MESC

The Chair shares the outcome of the Examination with the Student and any next steps as appropriate.

After a Student has passed their Comprehensive Examination, the Faculty Supervisor(s) shall review with the student the proposed Program of Study as soon as possible. A final program proposal shall be prepared to have due regard for the recommendations of the Comprehensive Examination Committee. The proposal shall be submitted by the Student to the CEE Graduate Office for review and approval by the CEE Graduate Chair. (Note that proposed credit for courses taken previously must be included in the proposal).

For a student who passes with conditions, the Examination Committee will determine the timeline for the Student to satisfy the conditions. If the student fails to satisfy the conditions within the determined timeline the Student will be required to withdraw unless special circumstances warrant the Associate Chair Graduate to extend the timeline.

For a Student that has failed but is given the option the re-attempt the Oral Examination, the Oral re-Examination must be held no later than three (3) months after the first failed Oral Examination. The Examination Committee will decide whether the Student is required to submit a revised Proposal before the Oral re-Examination. The Chair of the Oral re-examination will be a tenured CEE Faculty member selected by the Associate Graduate Chair and must not be a member of the Examination Committee. In exceptional circumstances, the Graduate Chair in consultation with the Examination Committee may permit a Student to take a Written Examination on the topic areas relevant to the Student's proposed research rather than re-attempt the Oral Examination. A Student will only be able to re-attempt the Oral Examination (or Written Examination in exceptional circumstances) once.

Assessment rubrics for the Oral Examination are available from the CEE Graduate Office and these should be used as a guideline to help the Student prepare for the Oral Examination.

**Student Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

<b>Assessment of the Proposal</b>				
	<b>Does not meet expectations (1)</b>	<b>Meet expectations (2)</b>	<b>Exceeds expectations (3)</b>	<b>Score* (1-3)</b>
1	<ul style="list-style-type: none"> <li>• Insufficient review of the current state of knowledge in the research field</li> <li>• Unable to provide the synthesis and critical review of the relevant scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>• Basic review of the current state of knowledge in the research field</li> <li>• Provides basic synthesis and critical review of the relevant scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>• A thorough and compact review of the current state of knowledge in the research field</li> <li>• Provides an in-depth synthesis and critical review of the relevant scientific literature</li> </ul>	
2	<ul style="list-style-type: none"> <li>• Failed to identify knowledge gaps in the current scientific literature</li> <li>• No description of the knowledge gaps to be addressed by the proposed research</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge gaps in the current scientific literature are identified</li> <li>• Knowledge gaps to be addressed by the proposed research are listed</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge gaps in the current scientific literature are identified and their impact discussed</li> <li>• Knowledge gaps to be addressed by the proposed research are thoroughly described</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Research objectives are either not described or vaguely described</li> <li>• Expected contributions from the proposed research are not described</li> </ul>	<ul style="list-style-type: none"> <li>• All major objectives to be achieved through the proposed research are clearly described</li> <li>• Expected contributions from the proposed research are described</li> </ul>	<ul style="list-style-type: none"> <li>• All major objectives to be achieved through the proposed research are clearly described and tied with the expected research outcomes</li> <li>• Expected contributions from the proposed research are described and tied in with the bigger picture</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Rationale for using particular research tool(s) or investigation technique(s) is not provided</li> <li>• Proposed research tool(s) or investigation technique(s) is poorly described with insufficient detail</li> </ul>	<ul style="list-style-type: none"> <li>• Rationale for using particular research tool(s) or investigation technique(s) is provided</li> <li>• Basic description of the proposed research tool(s) or investigation technique(s) is provided</li> </ul>	<ul style="list-style-type: none"> <li>• Rationale for using particular research tool(s) or investigation technique(s) is provided Proposed research tool(s) or investigation technique(s) is described from layman and expert perspectives</li> </ul>	
5	<ul style="list-style-type: none"> <li>• Poorly written and poorly organized proposal</li> <li>• Content unclear, lapses in coherence</li> <li>• Proposal lacks proper illustrations/figures</li> </ul>	<ul style="list-style-type: none"> <li>• No grammatical issues in the proposal and its organization is logical</li> <li>• Content is clear and coherent</li> <li>• Sufficient illustrations/figures are provided for clarity</li> </ul>	<ul style="list-style-type: none"> <li>• Well written and well organized proposal</li> <li>• Content is focused, consistent and very clear</li> <li>• Illustrations/figures are sufficient and well-prepared</li> </ul>	

\*Score in each category could be assigned between 1 and 3, an increment of 0.5 is allowed (i.e. 1.0, 1.5, 2.0, 2.5, or 3.0)

**Comprehensive Exam Research Proposal Assessment Form**

**Department of Civil and Environment Engineering**

**Student Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Comments:**

**Notes to the examination committee:**

- When reviewing the proposal, please ensure that you assess the proposal on all indicators (five categories) listed in the rubric and provide scores in each category that truly reflect the quality of the proposal.

**Feedback from Examiners about the new assessment tool**

Please provide a numeric response to the following question between 1 and 10 (1 = Strongly disagree, 10 = Strongly agree)

1. The rubrics are helpful in assessing the quality of the proposal \_\_\_\_\_

**Student Name:**

**Printed Name & Signature of Examiner:**

<b>Assessment of Candidate’s Performance in the Oral Examination</b>				
	<b>Does not meet expectations (1)</b>	<b>Meet expectations (2)</b>	<b>Exceeds expectations (3)</b>	<b>Score* (1-3)</b>
1	<ul style="list-style-type: none"> <li>Poor knowledge of basic scientific literature in the area of research</li> </ul>	<ul style="list-style-type: none"> <li>Good knowledge of basic scientific literature in the area of research</li> </ul>	<ul style="list-style-type: none"> <li>Thorough and in-depth knowledge of basic scientific literature in the area of research</li> </ul>	
2	<ul style="list-style-type: none"> <li>Unable to describe the research topic</li> </ul>	<ul style="list-style-type: none"> <li>Able to clearly describe the proposed research topic</li> </ul>	<ul style="list-style-type: none"> <li>Able to provide a well-articulated description of the proposed research topic</li> </ul>	
3	<ul style="list-style-type: none"> <li>Lack of understanding of the significance of proposed research in the bigger picture</li> </ul>	<ul style="list-style-type: none"> <li>A clear understanding of the significance of proposed research in the bigger picture</li> </ul>	<ul style="list-style-type: none"> <li>A deep understanding of the significance of proposed research in the bigger picture</li> </ul>	
4	<ul style="list-style-type: none"> <li>Unable to explain the fundamentals of investigation techniques(s)</li> </ul>	<ul style="list-style-type: none"> <li>Able to explain the fundamentals of investigation technique(s)</li> </ul>	<ul style="list-style-type: none"> <li>Able to explain the fundamentals of investigation technique(s) along with its advantages and limitations</li> </ul>	
5	<ul style="list-style-type: none"> <li>Knowledge and explanations of scientific concepts and/or theories are inaccurate or incomplete or unsupported</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge and explanations of scientific concepts and/or theories are accurate</li> </ul>	<ul style="list-style-type: none"> <li>Provides accurate and thorough explanations of scientific concepts and/or theories</li> </ul>	
6	<ul style="list-style-type: none"> <li>Answers questions with significant difficulty</li> </ul>	<ul style="list-style-type: none"> <li>Answers expected questions without difficulty</li> </ul>	<ul style="list-style-type: none"> <li>Answers all questions with explanations and elaborations</li> </ul>	

\*Score in each category could be assigned between 1 and 3, an increment of 0.5 is allowed (i.e. 1.0, 1.5, 2.0, 2.5, or 3.0)

**Notes to the examination committee:**

- The comprehensive exam is a test on the background that the student will need to carry out the proposed research. Hence, the exam will also focus on the fundamental engineering science and techniques relevant to their area of research.
- During the exam, please ensure that you test the candidate on all competency indicators (six categories) listed in the rubric and provide scores in each category that truly reflect Student’s performance in the Oral Examination.

**Feedback from Examiners about the new assessment tool**

Please provide a numeric response to the following question between 1 and 10 (1 = Strongly disagree, 10 = Strongly agree)

1. The rubrics are helpful in assessing the Student’s performance in the Oral Examination\_\_\_\_\_